

CLAIMS

1. A die, comprising:
 - a die body having a die hole for punching a work; and
 - a core provided in the die body and having a discharge hole

5 which is in communication with the die hole, wherein

 - the core is provided with a plurality of fluid injection ports for obliquely injecting fluid downward of the discharge hole, and
 - the die body is provided with an inflow port through which compressed fluid flows into the fluid injection port.

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2. The die according to claim 1, wherein
 - the core is made of resin, and
 - the discharge hole is tapered toward its upper side.
- 15 3. The die according to claim 1, wherein
 - an outer peripheral surface of the die body is formed with a peripheral groove which is in communication with the inflow port.
4. A die apparatus, comprising:
 - a die body having a die hole for punching a work; and
 - a die holder formed with a die mounting hole for detachably

20 holding the die body, wherein

 - the die body is provided with a negative pressure generator which downwardly draws a punching punched out by the die hole,

25 the die body is provided with an inflow port through which compressed fluid flows into the negative pressure generator, and

the die holder is provided with a fluid supply hole through which the compressed fluid is supplied to the inflow port.

5. The die apparatus according to claim 4, wherein

5 the die mounting hole is provided at its upper portion and lower portion with a seal section which prevents the compressed fluid from leaking.

6. A die, comprising:

10 a die body provided at its upper portion with a die hole;
a discharge hole formed in the die body and having a diameter larger than that of the die hole; and

a hole-forming tool engaging section formed on an outer peripheral surface of the die body, wherein

15 the hole-forming tool engaging section is formed with an inclined air injection hole for injecting air downward of the discharge hole.

7. The die according to claim 6, wherein

20 the hole-forming tool engaging section is a portion of a peripheral groove formed in an outer peripheral surface of the die body.

8. The die according to claim 6, wherein

25 the hole-forming tool engaging section is an inclined surface formed on an outer peripheral surface of the die body by countersinking working.

9. A die, comprising:
a die body provided at its upper portion with a die hole; and
a discharge hole formed in the die body and having a diameter
5 larger than that of the die hole, wherein
the die body is formed with a through hole which is in
communication with the discharge hole and an outer piece is fitted into
the through hole, and
the outer piece is formed with an inclined air injection hole for
10 injecting air downward of the discharge hole.

10. A die, comprising:
a die body provided at its upper portion with a die hole; and
a discharge hole formed in the die body and having a diameter
15 larger than that of the die hole, wherein
an inner peripheral surface of the die body is provided with a
hole-forming tool engaging section, and
the hole-forming tool engaging section is formed with an
inclined air injection hole for injecting air downward of the discharge
20 hole.

11. The die according to claim 10, wherein
the hole-forming tool engaging section is a portion of an inner
peripheral groove formed in an inner peripheral surface of the die body,
25 or a countersunk portion, or a tapered surface.

12. The die according to claim 10, wherein
the air injection hole is connected to a communication hole
formed from an outer peripheral surface of the die body.

5 13. A die, comprising:
a die body provided at its upper portion with a die hole for
punching a work, a lower portion of the die body being formed with a
discharge hole which is in communication with the die hole;
an annular peripheral groove provided around an outer
10 periphery of the die body; and
a plurality of fluid injection ports provided in the die body, the
fluid injection ports being inclined to obliquely inject fluid downward
of the discharge hole, wherein
each of the fluid injection ports is a conduit which passes
15 through the peripheral groove to the discharge hole, and
a cross-sectional area of the fluid injection port is set smaller
than that of the annular peripheral groove.

14. A die apparatus, comprising:
20 a die body provided at its upper portion with a die hole for
punching a work, a lower portion of the die body being formed with a
discharge hole which is in communication with the die hole;
a die holder formed with a die mounting hole for detachably
holding the die body;
25 a fluid supply hole formed in the die holder for supplying
compressed fluid toward the die body; and

a plurality of fluid injection ports provided in the die body, the fluid injection ports obliquely injecting compressed fluid supplied from the fluid supply hole downward of the discharge hole, wherein

a cross-sectional area of the fluid injection port is set smaller
5 than that of the fluid supply hole formed in the die holder.

15. A die, comprising:

a die body having a die hole for punching a work; and

a core provided in the die body and having a discharge hole

10 which is in communication with the die hole, wherein

the core is provided with a plurality of fluid injection ports for obliquely injecting fluid downward of the discharge hole,

the die body is provided with an inflow port through which compressed fluid flows into the fluid injection port, and

15 a cross-sectional area of the fluid injection port is set smaller than that of the inflow port provided in the die body.

16. A die, comprising:

a die body provided at its upper portion with a die hole for
20 punching a work, a lower portion of the die body being formed with a discharge hole which is in communication with the die hole; and

a plurality of fluid injection ports provided in the die body, the fluid injection port inclining to obliquely inject compressed fluid supplied toward the die body downward of the discharge hole, wherein

25 a cross-sectional area of the fluid injection port is set smaller than that of a fluid supply port.

17. A die, comprising:

a die body provided at its upper portion with a die hole for punching a work, a lower portion of the die body being formed with a discharge hole which is in communication with the die hole; and

a plurality of fluid injection ports provided in the die body, the fluid injection port inclining to obliquely inject compressed fluid supplied toward the die body downward of the discharge hole, wherein

in order to supply the compressed fluid toward the die body, a cross-sectional area of the fluid injection port is set smaller than that of a fluid supply port formed in the die holder which detachably holds the die body.